articulated at just one node above that one made the previous year, the branch thus gaining but one node in the year. This reminds one of the South Pacific Vitis, which produces tubers on the end of the branches, and at the end of each season disarticulates them).—On germination in acorns (in *Quercus virens*. Mr. Mazyck has noticed that the two petioles instead of being short were produced to a length of 1½ inches before the plumule and hypocotyledonary portions of the young plant commenced their growth, and a small tuberous projection nearly one-fourth the size of the acorn preceded the growth downwards of the radicle and upwards of the plumule. The cells in all of these were gorged with starch).—Dr. Leidy, notice of *Filaria immitis* in the dog, and on a Filaria reported to have come from a man.—W. N. Lockington, on the Pacific species of *Caulolatilus*.—Heilprin, Angelo, on the stratigraphical evidence afforded by the tertiary fossils of the peninsula of Maryland.—J. S. Kingsley, carcinological notes: I. (chiefly relates to the genus Thelphusa, describes two new species from Ceylon and one from West Africa; also a new species of Dilocarcinus. II. Revision of the Gelasimi, plates 9 and 10).—Dr. Allen, description of a fœtal walrus, and on the mammæ of bats.—Dr. R. Bergh, on the nudibranchs of the North Pacific Ocean, with special reference to those of Alaska, Part 2, plates 1 to 8.—Howard Kelly, on a sartorius muscle in the gorilla. This muscle was reinforced six inches from its origin by a muscular slip a quarter of an inch in breadth; it arose at the lower part of the middle third of the femur, between the origin of the quadriceps extensor and the insertion of the adductors joining the sartorius opposite the knee joint.—J. H. Redfield, on *Rochelia patens* (Nuttell), decided by Dr. Gray to be *Echinospermum floribundum*.—Report on plants introduced by means of the International Exhibition 1876.

Bulletins de la Société d'Anthropologie de Paris, tome 3, fasc. 1, 1880.—The present number contains the address of M. Sanson, president of the Society for 1880.—A communication from M. Mantegazza, on the Lapps.—A paper by M. Emile Goldi, on the migration of races in Egypt, which gave rise to an animated discussion, in which Mad. C. Royer opposed the author's view of the Asiatic origin of the Egyptian races.—M. Topinard proposed new methods for obtaining means differing from those suggested by M. Broca, which he considers to be based upon too small numbers.—M. Robin, Inspector of Primary Instruction in the Departement de Loir-et-Cher, invites the attention of the Society to the question whether it would not be desirable, to require from teachers in the public schools reports of the stature, growth, &c., of the pupils under their observation. M. Broca was of opinion that anthropological characteristics are of little value except in the case of adults, and that the important question of growth can only be satisfactorily considered when large numbers of children are simultaneously submitted to observation.—This number of the *Bulletins* devotes nearly seventy pages to the reprint of the "Inventory of the Megalithic Monuments of France," in which we have the combined result of the carefully-conducted observations of the General Commission for the registration of these remains, which was formally appointed by the Minister for Public Instruction in November, 1879. In this survey the country was divided into six sections, each of which was placed under the direction of one of the commissioners, while the general work was further subdivided into two groups, those of erratic boulders and megalithic monuments.—The last paper, by M. Paul Broca (on a new instrument invented by himself, and named "le goniomètre d'inclinaison et l'orthogone"), has a specially melancholy interest from the fact that it is connected with some of the latest work done by this eminent savant before his death.

Journal of the Franklin Institute, July.—The belt-dynamometer of Dr. C. W. Siemens, by R. Briggs.—High railway speeds, by W. B. Le Van.—Economic vaporisation of a boiler, by Chief Engineer Isherwood.—Progress of the dephosphorisation of iron, by F. Gautier.—The involute of the circumference of a circle, by L. D'Auria.—A new pendulum suspension, by L. H. Spellier.—The puddling process, past and present, by P. Roberts, jun.

Bulletin de l'Académie Royale des Sciences (of Belgium), No. 5.—On a whale caught on the coast of Charleston (South Carolina) on January 7, 1880, by M. Van Beneden.—An application of accidental images, by M. Plateau.—Note on the illumination of mines with phosphorescent sulphides, by M. Montigny.—Researches on the property possessed by solid bodies of welding by the action of pressure, by M. Spring.—On the line of (so called) helium, by Abbé Spée.—Excretory apparatus of the Trematodes and Cestoides, by M. Fraipont.—Discovery of hæmoglobin in the aquiferous system of an Echinoderm, by M. Foeltinger.

SOCIETIES AND ACADEMIES

EDINBURGH

Royal Society, June 21.—Prof. Maclagan, M.D., vice-president, in the chair.—Prof. Chrystal read a paper on a differential telephone, and on the application of the telephone to electrical measurements. A differential telephone was exhibited. It differed from an ordinary telephone in much the same way that a differential galvanometer differs from an ordinary single-coiled one. Two thin wires were twisted together and wound round the magnet in the usual way. It was shown that when an interrupted current passed in opposite directions through the two coils of the differential telephone no sound was heard. In using the instrument, its two coils were put into the two branches of a multiple arc, which was inserted in the circuit of the interrupted current. The interrupted currents of the two branches passed in opposite directions through the coils. The conditions for perfect compensation were not only that the resistances of the two branches must be equal, but also that their co-efficients of self-induction must be the same. If only one of these conditions was fulfilled a minimum of sound could be got, but absolute silence was impossible. The necessity for this twofold adjustment had not been hitherto sufficiently recognised; and it was to its neglect that the main difficulties in using Hughes' induction-balance were no doubt to be referred. Some years ago Prof. Chrystal had worked out the mathematics of the subject, but had been unable till recently to corroborate his results by experiment. Prof. Chrystal then proceeded to indicate how such a differential telephone could be applied to the measurement of coefficients of self-induction in terms of an arbitrary unit. Two coils were prepared of exactly the same resistance, but one was so wound as to have practically no self-induction. The self-induction of the other was the arbitrary unit mentioned above. In the rough model shown, two coils, whose distance apart could be varied at will, were introduced into each branch of the multiple arc above referred to, and were first adjusted so as to produce perfect compensation in the differential telephone. The other two equal resistance-coils were then introduced, one into the circuit of each induction pair, with the necessary effect of destroying the compensation. By a readjustment of the induction of one of the pairs, compensation was again secured, the change of distance of the coils of the altered pair corresponding therefore to the arbitrary unit. The two single coils were then removed, a fresh compensation obtained by alteration of the other induction pair, the single coils again introduced, a fourth compensation effected and a second stage reached in the formation of a graduated scale of self-induction in terms of an arbitrary unit; and so on till a complete scale was formed. Prof. Chrystal further pointed out how his instrument might be used for measuring capacities, and for investigating the real nature of the *opposition* offered by electrolytes to the passage of electric currents.—Prof. Tait communicated a paper on the determination of the specific heats of saline solutions, by Mr. Thomas Gray, B.Sc.—Mr. J. Y. Buchanan described a "navigational sounding-machine" of very simple construction. A glass tube, closed below by a plug kept sufficiently tight by a close-fitting india-rubber band, was provided above with a peculiarly-formed capillary orifice. The tube was first allowed to fill with air, and then sunk to the required depth in the sea. The air was compressed under the increased pressure, and the water began to trickle in from above. The quantity of water which so gained admittance was the datum from which the pressure, and therefore the depth, could be calculated. The water was removed by taking away the bottom plug; and the instrument was once more in a state suitable for use. Mr. Buchanan also communicated some experiments on the compressibility of glass. The value he obtained was greater than that obtained by Grassi by 2½ per cent.—Dr. Macfarlane read a short paper entitled "Suggestions on the Art of Signalling." He advocated the use of *three* qualities or symbols in preference to the dot-and-dash or two-symbolled alphabet of Morse, arguing that such a system would be found more rapid than the latter.—Dr. R. M. Ferguson communicated a note on the wire telephone, following

up the results obtained formerly by himself and those more recently arrived at by Preece and Chrystal. He showed that the sound emitted by a stretched iron wire through which an interrupted current was passing varied in a remarkable way with temperature, reaching a most evident maximum about a dull red heat. This variation he regarded as being in some way connected with the magnetic properties of iron, and on that ground criticised Prof. Chrystal's explanation of the De la Rive phenomenon as being due to rapid contractions and dilatations of the thin wires through which the current passed. In the remarks which followed Prof. Chrystal admitted the influence of magnetism in the case of the *iron*, a thick wire of which was as efficient as a thin wire; but in the case of what are usually reckoned non-magnetic metals, only *thin* wires of which are efficient for reproducing continuous sounds, he still thought that the true explanation was to be found in their changes of length. The altogether *peculiar* action of iron—though probably nickel and cobalt would have a similar action—seemed to him rather to favour this view than the other.

BOSTON, U.S.A.

American Academy of Arts and Sciences, June 9.—Prof. Joseph Lovering, vice-president, in the chair.—Dr. A. Auwers of Berlin, and Prof. Descloizeaux of Paris, were elected Foreign Honorary Members.—The Rumford medal was conferred on Prof. Josiah Millard Gibbs for his researches in thermodynamics.—The Hon. Charles Francis Adams resigned the office of president of the Academy, and Prof. Joseph Lovering was elected to the chair.—Dr. Oliver Wendell Holmes was chosen vice-president, Prof. Josiah P. Cooke corresponding secretary, and Prof. John Trowbridge recording secretary.

PARIS

Academy of Sciences, July 26.—M. Edm. Becquerel in the chair.—In name of a committee lately formed, M. de Quatrefages asked the Academy to open a subscription with the view of striking a medal in honour of M. Milne-Edwardes' services to science. Agreed.—Apparatus for measuring the heat of combustion of gases by detonation, by M. Berthelot. It consists essentially of a bomb suspended in a calorimeter.—On the dissolution of chlorine in water, by M. Berthelot. His observations point to the existence of a perchloride of hydrogen, probably a trichloride.—On the theory of the sines of superior orders, by M. Villarceau.—On the same, by M. Farkas.—Substances addressed to the Museum mistakenly as meteorites, by M. Daubrée. Most frequently they are scoriæ from works, and pyrites; but iron ores and a variety of substances are sent, and the senders are often men of scientific note. Bolides are often thought to fall near, while really far away.—On the successive transformations of the photographic image by prolongation of the luminous action, by M. Janssen. Beyond the second neutral state he gets a second negative image (requiring a million times the luminous intensity for the first), and a third neutral state, with uniform dark tint.—Report on the project contained in documents deposited by M. de Lesseps for the interoceanic canal. This reviews the past history of the question.—Report on a memoir by Dr. Companyo, entitled "Project of Organisation of the Service of Health of the Panama Interoceanic Canal," by M. Larrey.—M. Boutigny described some new experiments on the spheroidal state.—On the transformation of linear differential equations, by M. Appell.—On a property of algebraic functions and curves, by M. Pickard.—On the causes of interior alteration of steam boilers, by M. Lodin. From experiments with iron wire in sealed tubes holding various waters, he finds the predominant cause of oxidation to be the oxygen of dissolved air, and that this is not more intense in the case of distilled water than of calcareous, but the opposite. The action of some disincrustants is studied.—On a method of direct autocollimation of objectives and its application to measurement of indices of refraction of the glasses composing them, by M. Martin.—On the employment of the spherometer, by the same. He has improved it in certain points.—On the causes of terrestrial magnetism, by M. Lemström. He magnetises a vertically-suspended bar of soft iron, by rapid rotation of a paper tube, with two concentric walls round it. The earth he supposes similarly magnetised by rotating in a space of ether.—On an electrodynamic paradox, by M. Gérard-Lescuyer. When the current of a dynamo-electric machine (Siemens) is sent into a magneto-electric machine (Gramme), the latter moves with increasing speed; then it slackens, stops, and turns in the opposite direction; this action is reversed in turn, and so on. The polarities of the inductors are reversed.—Researches on ozone, by MM. Hautefeuille and Chappuis. The tension of transformation of ozone in oxygen under the silent discharge increases rapidly with fall of temperature. In passing from 20° to − 23° it is nearly doubled. Increase of pressure favours the production of ozone.—On a new isomeric modification of hydrate of alumina, by M. Tommasi.—Observations on M. Bourgoin's note on the ultimate action of bromine on malonic acid, by M. Petrieff.—On the molecular heat and volume of rare earths and their sulphates, by MM. Nilson and Petersson.—On a new fermentation of glucose, by M. Boutroux. What he called *lactic* fermentation in a note on March 4, 1878, he now calls *gluconic*.—Absorption and elimination of poisons in cephalopoda, by M. Yung. Absorption takes place most promptly by the branchiæ (very weakly by the skin), and according to osmotic power of the substances. Elimination is by the liver and the sac of black liquid.—Velocity of transmission of the motor excitation in the nerves of the lobster, by MM. Fredericq and Vandevelde. It is about 6m. per sec. at + 10° to + 12° C., and 10 to 12m. at + 18° to + 20°.—On the differential sensibility of the eye for small luminous surfaces, by M. Charpentier. As the two illuminated surfaces are diminished the power of distinguishing them greatly increases.—Contributions to palæozoic flora, by M. Crié.—The Loire, the Loiret, and subterranean currents of the Valley of Orleans, by M. Sainjon.—On the bed of cut flints at El Hassi (Algerian Sahara), by M. Rolland.—On the means of obtaining photographic negatives in a free balloon, by M. Desmarets. In a recent ascent he used an obturator like M. Janssen's.

GÖTTINGEN

Royal Society of Sciences, April 7.—On the conditions of geysers, by H. O. Lang.—On the extension of Abel's theorem to integrals of any differential equations, by L. Koenigsberger.

May 1.—Notices on some Australian volatile oils, by Baron von Müller.—Analysis of electric discharges, by W. Holtz.—An improved centrifugal machine for schools, by the same.

June 5.—On three-point contact of curves, by H. Schubert.—On those algebraic equations between two variable quantities which allow a number of rational univocal reversible transformations into themselves, by G. Hettner.

July 3.—Voltaic element of aluminium, by F. Wöhler.—On the functions which arise by inversion of solutions of linear differential equations, by L. Fuchs.—On algebraic logarithmic integrals of non-homogeneous linear differential equations, by L. Koenigsberger.—On a new arrangement of the magnets of a galvanometer, by K. Schering.

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